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Research Article

From informed to overwhelmed: The dual dynamics of political microtargeting exposure on political interest and involvement

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ABSTRACT

Political microtargeting (PMT) has become a powerful tool for political campaigns, shaping voters' exposure to tailored messages. This study investigates the impact of PMT exposure on political interest and engagement during an election campaign, distinguishing between within-person and between-person associations. Using a longitudinal design across three waves and applying a random intercept cross-lagged panel model, we examined how exposure to PMT influences individual-level changes in political outcomes over time. The results show strong positive associations at the between-person level, indicating that people who are more often exposed to PMT also report greater political interest and engagement. However, no significant within-person associations were found. Although these within-person relationships were not significant, they showed an interesting trend that was in line with the theoretical expectation that a sudden surge in PMT exposure (e.g., during an election campaign) might negatively impact political outcomes. The potential reasons for this non-significance are further explored in the manuscript. These findings contribute to the understanding of PMT's role in shaping political attitudes and provide important directions for future research.

Keywords: political microtargeting, political interest, political engagement, elections, political campaign

INTRODUCTION

In recent years, political microtargeting (PMT) has emerged as a pivotal tool in the arsenal of political campaigns, capitalizing on digital footprints to tailor messages to individual voters (Dobber et al., 2017; Zuiderveen Borgesius et al., 2018). This strategy harnesses vast amounts of data from social media and other online platforms to segment the electorate and deliver personalized content (Chester & Montgomery, 2017). By tailoring messages to the specific interests and beliefs of individual voters, political campaigns can sway opinions and gain an electoral advantage. The growing use of PMT in political campaigns has triggered an increased focus among researchers on assessing the impact of PMT on political outcomes such as political attitudes and voting intentions (e.g., Hirsch et al., 2023; Krotzek, 2019; Tappin et al., 2023; Zarouali et al., 2022). Although we have some insights into the effects of PMT, this body of research is still very limited. More precisely, recent literature has pointed out the need to gain more knowledge about the influence of PMT *over time*, especially during electoral campaigns, where the frequency of encountering PMT is significantly higher (Hirsch et al., 2024; Matthes et al., 2022).

In addition, recent academic contributions in the field of media effects studies have underlined the critical need to separate the analysis of (social) media influences into between-person differences and within-person changes (Beyens et al., 2021; Valkenburg et al., 2021). In other words, the influence of PMT may manifest across both inter-individual differences and intra-individual variations, highlighting fluctuations within the same person over time (Otto & Kruikemeier, 2023). At the between-person level, individuals with a generally higher level of PMT exposure might also exhibit higher levels of political interest and engagement than individuals with lower levels of PMT exposure; while, at the within-person level, it may be that a sudden increase in PMT exposure (e.g., during an electoral season) could induce a state of overwhelm, potentially decreasing a person's political interest and engagement. This dual-dynamic within PMT has yet to be examined and is crucial to understanding the nuanced relationship between PMT exposure and its relationship with political outcomes. Against this backdrop, this pre-registered study[1] uses a longitudinal design across three waves (with a 3-month time interval) in combination with a *random intercept cross-lagged panel model* (RI-CLPM) analysis (Hamaker et al., 2015) to comprehensively examine both between-person and within-person associations of PMT on political interest and engagement. This will provide unprecedented insights into how PMT exposure is associated with an individual's connection to the political realm over an extended period of time.

LITERATURE REVIEW

Political Microtargeting

Although the tactic of engaging voters with tailored messages is not a new phenomenon in political campaigns, the integration of big data and technology has greatly refined this approach, leading to the widespread implementation of PMT (Dommett, 2019; Klinger et al., 2023). PMT refers to the practice of targeting political messages to specific individuals based on their online behavior and other data (Zuiderveen Borgesius et al., 2018). Over the last couple of years, there has been a significant increase in PMT expenditures worldwide, with projections suggesting it will reach $836 billion by 2026 (European Council, 2023). This surge in PMT investment signifies its perceived value in shaping electoral outcomes by enabling campaigns to craft messages that resonate on a personal level with voters. Despite its widespread adoption, PMT is not without controversy. Ethical considerations and the potential for misuse of voter data through PMT practices–especially since the Cambridge Analytica scandal–have sparked intense debate among scholars and policymakers (Bodó et al., 2017; Ward, 2018). Critics argue that PMT can lead to privacy invasions, threaten individual autonomy, and even manipulate voter opinions by exploiting their (psychological) vulnerabilities (Burkell & Regan, 2019; Dowling, 2022; Susser et al., 2019; Tufekci, 2015). On the other hand, PMT has also been praised for its ability to deliver highly relevant political content to specific segments in society, thereby increasing their political interest, involvement and voter turnout (Coppock et al., 2020; Hamid et al., 2022; Matthes et al., 2022).

Another segment of the PMT research focuses on the persuasive impact of such strategies, which translates to the question whether PMT is truly able to influence voters. In this context, studies have found that PMT may result in more positive attitudes toward the party employing this approach, as well as an increased intention to vote for that party (Chu et al., 2024b; Lavigne, 2021; Zarouali et al., 2022, 2024). In addition, specific forms of PMT (e.g., populist advertising) have also been shown to influence democratic attitudes such as trust in democracy (Zarouali & Hameleers, 2026). Other studies confirm these results but add an essential nuance: the effects of PMT are expected to be small, suggesting that its ability to sway voters is present but limited, offering political parties only slight persuasive advantage rather than a panacea for persuasion (Coppock et al., 2020; Tappin et al., 2023). However, with technology's rapid development, particularly through generative AI, PMT could become more persuasive than ever, transforming ads into a potential "manipulation machine" (Simchon et al., 2024). In addition to these persuasion effects, other studies provided more knowledge about when PMT may work. For instance, evidence suggests that PMT achieves greater effectiveness when ads are closely aligned with a person's personality traits (Zarouali et al., 2022, 2024), when ads cover topics people really care about (Chu et al., 2024a), when individuals see a strong

[1] https://osf.io/3bwtv

personal fit with the message (Binder et al., 2022; Hirsch et al., 2024), and when there is a clear disclosure accompanying the political ad (Hirsch et al., 2023; Jansen & Krämer, 2023).

While these studies offer valuable insights into PMT, the research field remains notably underdeveloped, with a couple of important research gaps. First, scant insights are available regarding the potential of PMT to affect citizens' relation with regard to politics and their civic participation (Errenst et al., 2023). Second, knowledge about PMT's long-term impact within specific electoral campaigns is also rather limited, which demands further exploration (Matthes et al., 2022). Finally, the majority of existing research has focused on between-person associations, neglecting the within-person changes. Recent discussions in media effects studies have highlighted the importance though of distinguishing both inter-individual and intra-individual associations, as media effects are typically expected to occur within individuals (Beyens et al., 2021; Stavrova & Denissen, 2021; Valkenburg et al., 2021). This research will delve into both types of associations, aiming to assess PMT's role in two critical democratic theory variables: political interest and political engagement.

Political Interest and Engagement: Between-Person Associations

There is a general consensus that political interest and political engagement among the citizenry is crucial for a healthy democracy, as it fosters informed voting and public deliberation (Dahlgren, 2009). They are considered to be fundamental factors linked to an increased support for democracy (Mont'Alverne et al., 2023). *Political interest* refers to a citizen's willingness to pay attention to political phenomena at the possible expense of other topics (Lupia & Philpot, 2005). A core principle of democratic theory posits that for the public to adequately explore political options, there must be a substantial interest in political issues (Lecheler & de Vreese, 2017; Rapeli, 2013). It is often regarded as one of the most significant predictors of political behaviors essential for the well-functioning of democracy (Prior, 2010). Furthermore, it encourages citizens to remain informed about current events and shifts in the political landscape, enabling them to make decisions aligned with their values and beliefs (Miller et al., 2023; Shehata & Amnå, 2019). This interest helps ensure that citizens remain vigilant and active in holding their representatives accountable. *Political engagement* refers to the online activities through which citizens can be involved and connected to politics and public concerns (Shehata et al., 2016). It encompasses a wide range of actions, including sharing political content, signing petitions, or participating in political discussions, all of which contribute to a more robust democratic process (Bosi et al., 2022; Jenkins, 2016; Koc-Michalska et al., 2016). Engagement is essential for democracy because it empowers citizens to participate in shaping their societies, thereby ensuring that governance reflects the will and interests of the population (Bursztyn et al., 2021; Metzger et al., 2019). In addition, political engagement not only strengthens democratic institutions but also helps build a sense of community and collective responsibility among citizens (Barrett & Brunton-Smith, 2014; McBride et al., 2006).

In the context of the present study, we would expect people who are frequently exposed to PMT on social media would also have more political interest and higher engagement than people who are less frequently exposed (Freedman et al., 2004; Strömbäck & Shehata, 2010). Zuiderveen Borgesius et al. (2018) argued that PMT can support democratic engagement by reaching out to individuals who disengage from mainstream news sources, hereby increasing their interest in political matters and encouraging their participation in political processes. At its core, PMT involves tailoring of ads to match a person's interests and (socio)demographic profile, presenting political issues and viewpoints that are in harmony with the individual's ideological beliefs (Baviera et al., 2025; Chester & Montgomery, 2017). Because of this technique, PMT shows advertisements that are more *personally relevant*, which enhances their influence on voters (Zarouali et al., 2024). Therefore, studies have found that PMT is positively associated with both political interest and engagement. More specifically, a study by Matthes et al. (2022) demonstrated that perceived PMT can be beneficial for democracy by increasing citizens' political interest over time. Additionally, further research has found that campaign ads and political marketing activities on social media can increase political engagement and involvement among citizens (Hamid et al., 2022; Matthes & Marquart, 2015). Against this backdrop, we can expect that higher levels of exposure to PMT covary with higher levels of political interest and political engagement on a between-person level. Therefore, we formulate the following hypotheses:

H1. Higher frequency of PMT exposure is positively associated with higher levels of political interest (on the between-person level)

H2. Higher frequency of PMT exposure is positively associated with higher levels of political engagement (on the between-person level)

Political Interest and Engagement: Within-Person Associations

In the previous section, we discussed the potential between-person associations between PMT and political interest/engagement. However, it is also crucial to look at it from a within-person level, hereby capturing *within-person* changes in PMT-effects over time (i.e., change relative to an individual person's own average). This approach aligns with the recent calls from scholars to examine not only *inter-individual* (the most dominant approach) but also *intra-individual effects* (e.g., Beyens et al., 2021; Valkenburg et al., 2021). In the literature, most longitudinal studies about PMT (e.g., Binder et al., 2022; Dobber et al., 2019; Hirsch et al., 2024; Matthes et al., 2022) focus exclusively on between-person associations, while recent scholars increasingly suggest that examining PMT from within-person perspective could enhance this field of study (Meier et al., 2024; Otto & Kruikemeier, 2023). In the literature of digital political communication research, we can witness an increasing focus on these analyses at the within-person level. For instance, Shehata and Amnå (2019) found that higher levels of news media use (e.g., on social media) lead to an increased political interest on the intra-individual level. Or more recently, a study has shown that social media can influence political conspiracy thinking on the within-person level rather than the between-person level (Valenzuela et al., 2024). This within-person effect suggests that it is not merely about how frequently different people use social media, but rather how changes in a single person's social media habits can affect their susceptibility to conspiracy theories over time.

Against this backdrop, this study will disentangle the impact of PMT on these two levels, which will lead to a more nuanced understanding of its effects in political campaigns. For someone who typically has low or moderate exposure to PMT, a sudden spike or surge in PMT (i.e., due to an upcoming election or significant political event) relative to what s/he is used to, might experience a potential decrease in political interest and engagement due to feeling overwhelmed or bombarded by too much political content in a short span. This can be explained by *cognitive load theory* (Sweller, 1988). Cognitive load refers to the "mental effort" required by individuals to process a given amount of information or to complete a certain task. In the online information age, the issue of cognitive load has become increasingly prominent (Zhu et al., 2024). Research indicates that cognitive load significantly impacts individual psychology and behavior, especially in environments with high online information density (Belabbes et al., 2022; Roetzel, 2019). For instance, results from a recent study showed that higher quantities of information significantly increase the information overload of consumers, which exerts a negative impact on their behavioral intentions (Cheng et al., 2020). This suggests that managing the volume of information presented to individuals is crucial in maintaining their attention and positive responses (Vettehen & Schaap, 2023).

In the realm of advertising, an increased information quantity often takes the form of "*advertising overexposure*." Overexposure refers to the perception of being exposed to similar messages more frequently than desired (So, 2022). It is commonly understood that overexposure to an ad campaign (i.e., a higher frequency of exposure to advertisements within a campaign) can negatively impact its overall effectiveness, making it essential to avoid bombarding and overly disrupting consumers' browsing experiences in an intrusive manner (Adams, 2021; IAB Europe, 2019). Overexposure to PMT at one point in time (e.g., during an election campaign) may therefore lead to a decline in political interest later on, as the overabundance of targeted messages may lead to saturation and annoyance. This overexposure can also negatively affect political engagement, as individuals may feel overwhelmed by tailored content, resulting in reduced participation in political activities.

Altogether, we expect that a (temporary) higher frequency of targeted political ads may contribute to cognitive load, which would negatively influence people's political interest and engagement. In short, we formulate the following two hypotheses:

H3. An increase in PMT exposure (on the within-person level) at one point in time predicts a decrease in levels of political interest at a later point in time

H4. An increase in PMT exposure (on the within-person level) at one point in time predicts a decrease in levels of political engagement at a later point in time

METHOD

Sample

This study is part of a larger longitudinal project with three data collection points over a period of six months. Flemish adults were recruited through a research panel to fill in three surveys. We strived towards a sample representative of the Flemish population. For respondents, two criteria had to be met: they had to be adults aged 18 or older, and they needed to consent to participate in the study. Apart from these two criteria, participants were selected randomly and without bias, with no one excluded based on race, gender, or educational level. There were 1,762 adults who participated in the study. In the study's project procedures, it was decided to remove participants from the analytical sample who did not complete the entire questionnaire. As such, 1,518 adults completed the wave 1 (W1) questionnaire, 1,115 the W1 and wave 2 (W2) questionnaire, and 891 the W1, W2, and wave 3 (W3) questionnaire. Of these 1518 participants, 46.9% were men, 52.9% were women, and .2% indicated non-binary or a different gender. The mean age was 49.544 years old (standard deviation = 16.137). Regarding education, 12.8% had low education, 44.9% moderate, and 42.3% higher education.

We explored missingness patterns in the data with Little MCAR's test. Results showed that data were not missing completely at random ($\chi 2$ = 23.211, df = 9, p < .01). Logistic regression analyses (**Table 1**) were performed to examine whether missing data are dependent on known variables such as gender and age and thereby can be considered missing at random (Gelman & Hill, 2007). The results showed that women and younger adults were more likely to have a missing value at all the W2 variables, and women were as well more likely to have a missing value at all the W3 variables. There was no missing data on the W1 variables. Because missingness occurred at the wave level rather than at the level of individual variables (as respondents were removed from a wave if they did not complete the full questionnaire), these results indicate that women and younger adults were more likely to drop out of this study. To handle these missing data patterns, we used the full information maximum likelihood estimator in Mplus.

Procedure

Participants for this study were recruited through a panel research company to engage in a longitudinal investigation on the influence of social media advertising during a political campaign season. This study was part of a larger research project on social media and elections. Participants were first informed about the study's three-wave structure over six months and the possibility of earning points upon completing the final

Table 1. Logistic regression analyses to explore missing data patterns

		Gender	Age
PMT exposure (W2)	Beta	-.373**	.009*
	SE	.119	.004
	Exp(B)	.689	1.009
PMT exposure (W3)	Beta	-.528***	.005
	SE	.106	.003
	Exp(B)	.590	1.005
Political interest (W2)	Beta	-.373**	.009*
	SE	.119	.004
	Exp(B)	.689	1.009
Political interest (W3)	Beta	-.528***	.005
	SE	.106	.003
	Exp(B)	.590	1.005
Political engagement (W2)	Beta	-.373**	.009*
	SE	.119	.004
	Exp(B)	.689	1.009
Political engagement (W3)	Beta	-.528***	.005
	SE	.106	.003
	Exp(B)	.590	1.005

Note. ***p <.001; **p < .01; *p < .05; gender is a dichotomous variable and is coded: man = 1, woman = 2; 'man' was chosen as the reference category; the categories 'non-binary' and 'different' were very limitedly present in the sample and could thus not be meaningfully interpreted as predictors; & all dependent variables are dichotomous and are coded: 0 = missing value on this variable, 1 = not a missing value

wave. These points could be exchanged for financial incentives provided by the panel research company. At the start of each wave, participants were briefed on the survey's objectives and intent, and their consent was obtained. In the W1 survey, participants were required to provide background sociodemographic details, including age, gender, and education, along with general perceptions and attitudes. This is the reason why the W1 survey was slightly longer than the subsequent two surveys. Apart from this difference, all three surveys contained the same set of variables related to media consumption habits, attitudes and beliefs, and media perceptions (the surveys from all waves are accessible via OSF). Participants were reminded that their responses would remain anonymous and that they could withdraw from the study at any time without consequence. Efforts were made to minimize participant dropout by sending reminders. After completing the final survey, participants were thoroughly debriefed and given a more detailed explanation of the study's purpose. All participants provided written informed consent before participating in every survey. The study received ethical approval from our institutional review board.

Measures

Exposure to political microtargeting

One self-constructed item asked participants at all three waves how often they are exposed to political advertisements on social media. A 7-point Likert scale was used (1 = *never*; 2 = *less than once a month*; 3 = *several times a month*; 4 = *once a week*; 5 = *several times a week*; 6 = *daily*; 7 = *several times a day*). The use of a single-item measure is quite common in survey-based research assessing perceived exposure to political communication (e.g., Masood et al., 2024; Valeriani & Vaccari, 2016; Zarouali & Hameleers, 2026). However, these measures do not allow reliability estimation and may not fully capture the multidimensional nature of exposure, which should be considered when interpreting the results. We address this limitation explicitly in the discussion section.

Political interest

One item based on Dubois and Blank (2018) was used to assess political interest at all three waves. Participants rated on a bipolar scale going from 1 (= *not interested at all*) to 7 (= *very interested*) how interested they are in politics.

Political engagement

Four items based on Bosi et al. (2022) were used to assess political engagement at all three waves. Participants were asked how often

(1) they discuss or share an opinion about politics on social media,

(2) they follow or like a politician or political party on social media,

(3) they visit a website of a political party or a politician, and

(4) they look online for information about politics.

A 7-point Likert scale was used (1 = *never*; 2 = *less than once a month*; 3 = *several times a month*; 4 = *once a week*; 5 = *several times a week*; 6 = *daily*; 7 = *several times a day*). Principal axis factoring analysis demonstrated a one-factor structure for this scale (W1 initial eigenvalue [IE] = 2.261; W1 explained variance [EV] = 56.525; W2 IE = 2.173; W2 EV = 54.314; W3 IE = 2.114; W3 EV = 52.861). The scale also proved to be reliable across waves (W1 ω = .745; W2 ω = .721; W3 ω = .704).

Political orientation

Political orientation at W1 was asked with one item based on Dubois and Blank (2018) on an 11-point Likert scale from (1 = *left*; 11 = *right*).

Social media consumption

Respondents indicated at W1 how many minutes they spend per day on social media.

Socio-demographics

Age, gender, and education level were questioned.

Analytical Strategy

This study was preregistered prior to data collection, which can be accessed via OSF (see link footnote 1). First, we calculated means, standard deviations and intraclass correlations (ICC) of the main variables. Then, we ran two RI-CLPM (Mulder & Hamaker, 2021). Exposure to PMT was in the two models included as the independent variable, political interest was included in the first model as the dependent variable and political engagement was included in the second model as the dependent variable. Mean scores of the variables at the three waves were entered as manifest variables in the model. These manifest variables were regressed on a corresponding latent variable, and the loadings were constrained at 1. These latent variables represent the within-person components, and we modeled the relationships using autoregressive, concurrent, and cross-lagged pathways between them. Random intercept (RI) factors were modelled with the manifest variables at all three waves being used as indicators with a loading constrained at 1. Error variances of the manifest variables were constrained at 0.

We controlled social media consumption and political orientation by modelling predictive pathways of these variables to the manifest variables in the model. We also checked whether the means of the manifest variables could be constrained over time, which resulted in more parsimonious models. The variances of the RI's also significantly differed from 0, meaning that there exist stable between-person differences in the variables which renders the RI-CLPM an appropriate analysis technique.

RESULTS

Descriptive Statistics

Table 2 displays the means, standard deviations and zero-order correlations. We also calculated for all main variables the ICC. This analysis revealed that the ICC for PMT exposure was .639, which means that 63.9% of the variance in exposure to PMT can be attributed to between-person differences (rather than fluctuations within a person). The remaining variance results from within-person differences and error variance. The ICC for political interest was .825 and for political engagement .755.

Random Intercept Cross-Lagged Panel Models

The means of both models could be constrained over time. The goodness-of-fit-indices revealed that both models had excellent model fit. For the model with political interest, this was: χ^2 (4) = 6.088, p = .193, CFI = .999, RMSEA = .019, 90% confidence interval [CI] = [.000/.046], SRMR = .009, χ^2/df = 1.522. For the model with political engagement, this was: χ^2(4) = 7.619, p = .107, CFI = .999, RMSEA = .024, 90%CI = [.000/.051], SRMR = .008, χ^2/df = 1.905. For a visual representation of the models, see **Figure A1** and **Figure A2** in **Appendix A**.

Between-person results

Parameter estimates can be found in **Table 3**. We found at the between-person level a positive correlation between exposure to PMT and political interest (β = .328, *SE* = .041, 95% CI [.244, .405]), as well as between

Table 2. Descriptive statistics and zero-order correlations

	M	SD	Zero-order correlations													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	49.544	16.137	-	-.090**	-.380**	.116**	-.137**	-.101**	.105**	-.038	-.107**	.115	-.023	-.138**	.069*	-.084*
2. Gender	/	/		-	.162**	-.157**	.075**	-.075**	-.286**	-.169**	-.056	-.267**	-.178**	.000	-.253**	-.121**
3. Education	2.294	.682			-	-.152**	-.051*	-.008	.074**	-.004	.004	.091**	-.004	.023	.076*	-.001
4. Political orientation	5.580	2.654				-	.041	.071**	.033	.058*	.033	.035	.034	.007	.021	.043
5. Social media use	93.832	82.127					-	.234**	-.080**	.173**	.259**	-.051	.162**	.297**	-.041	.216**
6. PMT exposure (W1)	3.820	1.777						-	.239**	.406**	.648**	.178**	.358**	.599**	.179**	.349**
7. Political interest (W1)	4.630	1.758							-	.473**	.167**	.829**	.447**	.204**	.819**	.461**
8. Political engagement (W1)	1.927	.988								-	.370**	.425**	.765**	.338**	.450**	.736**
9. PMT exposure (W2)	3.760	1.813									-	.158**	.364**	.672**	.164**	.360**
10. Political interest (W2)	4.720	1.706										-	.459**	.182**	.833**	.438**
11. Political engagement (W2)	1.936	.958											-	.343**	.432**	.775**
12. PMT exposure (W3)	4.070	1.917												-	.182**	.396**
13. Political interest (W3)	4.740	1.720													-	.476**
14. Political engagement (W3)	1.916	.937														-

Note. M: mean; SD: Standard deviation; **p < .01; *p < .05; gender is a dichotomous variable and is coded: man = 1, woman = 2; & the categories 'non-binary' and 'different' were very limitedly present in the sample and could thus not be meaningfully interpreted in correlations

Table 3. Parameter estimates in the RI-CLPM

Model		SC	SE	95% CI SC
Model 1. PMT exposure and political interest				
Within auto-regressive paths	PMT exposure (W1) → PMT exposure (W2)	.133	.081	[-.021/.292]
	PMT exposure (W2) → PMT exposure (W3)	.220**	.068	[.092/.355]
	Political interest (W1) → Political interest (W2)	.007	.108	[-.232/.200]
	Political interest (W2) → Political interest (W3)	-.059	.128	[-.338/.162]
Within cross-lagged paths	PMT exposure (W1) → Political interest (W2)	-.049	.075	[-.174/.112]
	PMT exposure (W2) → Political interest (W3)	-.142	.117	[-.360/.093]
	Political interest (W1) → PMT exposure (W2)	-.132	.095	[-.307/.053]
	Political interest (W2) → PMT exposure (W3)	-.048	.066	[-.172/.080]
Within correlations at W1	**PMT exposure (W1) with Political interest (W1)**	.160*	.063	[.033/.284]
Between	**RI PMT exposure with RI Political interest**	.328***	.041	[.244/.405]
Model 2. PMT exposure and political engagement				
Within auto-regressive paths	PMT exposure (W1) → PMT exposure (W2)	.082	.081	[-.064/.243]
	PMT exposure (W2) → PMT exposure (W3)	.222**	.064	[.101/.355]
	Political engagement (W1) → Political engagement (W2)	.139	.120	[-.119/.356]
	Political engagement (W2) → Political engagement (W3)	.065	.153	[-.261.341]
Within cross-lagged paths	PMT exposure (W1) → Political engagement (W2)	-.001	.062	[-.122/.118]
	PMT exposure (W2) → Political engagement (W3)	.028	.078	[-.142/.182]
	Political engagement (W1) → PMT exposure (W2)	.060	.078	[-.094/.205]
	Political engagement (W2) → PMT exposure (W3)	.016	.064	[-.111/.136]
Within correlations at W1	**PMT exposure (W1) with Political engagement (W1)**	.209***	.055	[.090/.307]
Between	**RI PMT exposure with RI Political engagement**	.481***	.035	[.410/.548]

Note. ***p < .001; **p < .01; *p < .05; for clarity purposes, associations with control variables and correlations between error terms are not shown; significant associations are displayed in **bold**; & SC: Standardized coefficients

exposure to PMT and political engagement (β = .481, *SE* = .035, 95% CI [.410, .548]). This means that people who are more than others exposed to PMT also have higher political interest and engage more themselves in politics, confirming **H1** and **H2**.

Within-person results

At the within-person level, none of the cross-lagged paths between exposure to PMT and political interest were significant, rejecting **H3** (β = -.049, *SE* = .075, 95% CI [-.174, .112]; β = -.142, *SE* = .117, 95% CI [-.360, .093]). Similarly, none of the cross-lagged paths between exposure to PMT and political engagement were significant, rejecting **H4** (β = -.001, *SE* = .062, 95% CI [-.122, .118]; β = .028, *SE* = .078, 95% CI [-.142, .182]). However, it is noteworthy that the signs on the cross-lagged associations of political interest flipped in the direction predicted by our hypotheses, though these associations were not statistically significant. We did find positive correlations between the within-person components of exposure to PMT and political interest at W1 (β = .160, *SE* = .063, 95% CI [.033, .284]), as well as between exposure to PMT and political engagement at W1 (β = .209, *SE* = .055, 95% CI [.090, .307]), suggesting that individuals who were more exposed to PMT at a given time point also had higher political interest and engagement at that time.

GENERAL DISCUSSION

The current study explored the associations between PMT exposure on the one hand and political interest as well as engagement on the other hand. In doing so, we followed current recommendations in social media effects literature to distinguish within-person and between-person associations (Beyens et al., 2021; Valkenburg et al., 2021). Strong associations were found at the between-person level indicating that adults who are more than others exposed to PMT also have a higher interest in politics and engage more in politics. Yet, no statistically significant within-person associations were found. Although a temporary increase in PMT exposure was followed by a decrease in political interest at the next wave, this trend did not reach statistical significance. While such a pattern could be suggestive of a dynamic in which heightened exposure becomes overwhelming, the evidence is too weak to draw substantive conclusions. The findings and their implications for research on PMT are discussed in more detail below.

First, the between-person results showed positive links between PMT exposure and political interest, as well as between PMT exposure and political engagement. Thus, adults who perceive to have a higher exposure

to PMT also report a higher interest in politics and a higher engagement in politics than adults who report lower PMT exposure levels. This finding resonates with Matthes et al. (2022) who found that exposure to targeted political content can reinforce individuals' existing interest in politics. At the same time, these associations may also reflect processes of *selective exposure* and *reinforcement*. Individuals who are already more interested and engaged in politics are more likely to encounter, attend to, and remember political content online, including microtargeted political advertisements (Boulianne, 2015; Strömbäck & Shehata, 2010). As a result, higher reported exposure to PMT may partly reflect that politically interested individuals are embedded in information environments where such messages are more prevalent, reinforcing existing levels of political interest and engagement rather than necessarily generating them.

At the within-person level, no significant associations were found between PMT exposure and political interest as well as engagement over time. The increase in PMT exposure resulting from the election campaign at the time of the data collection was not followed by a decrease in political interest or engagement. However, it is worth noting that the cross-lagged associations between PMT exposure and political interest showed a reversal in direction (i.e., positive association on the between-level, and negative association on the within-level), though this change was not significant. This directional shift is in line with our hypotheses though, highlighting the idea that that a sudden overload of PMT may do more (political) harm than good (Adams, 2021; IAB Europe, 2019), even if the associations were not strong enough to reach statistical significance. This lack of significant within-person associations might be explained by the fact that people may not really have experienced this increase in PMT as overwhelming enough to generate significant decline in political outcomes. In addition, the political ads that adults encounter on social media constitutes a small portion of their overall social media consumption (Bode & Vraga, 2018; Enberg, 2020). Therefore, even with a sudden increase in exposure to PMT, the absolute amount of PMT content may have remained limited to induce a state of political advertising overexposure.

In addition, the lack of significant results at the within-person level may also be explained by the temporal spacing between the measurement waves. On the one hand, it is possible that a sudden increase in PMT exposure at one point in time indeed induces a state of overwhelm and therefore decreases a person's political interest and engagement immediately after but that these effects do not endure over the course of a few months. On the other hand, it is also possible that the effects of PTM exposure unfold with a temporal delay, consistent with a sleeper effect mechanism in which the impact of a persuasive message emerges only after some time (Kleinnijenhuis, 2020). Yet the three-month time lag is perhaps still too long to detect the point at which a sleeper effect might have occurred. To better explore such temporal dynamics, future research could use experience sampling methods (ESM), where data can be collected daily, allowing for a more fine-grained understanding of when effects arise, whether immediately, gradually or after a delay (Otto & Kruikemeier, 2023; Schnauber-Stockmann & Karnowski, 2020).

This study offers significant theoretical contributions to the literature on PMT and its relationship with political outcomes. By distinguishing between within-person and between-person associations, it advances the understanding of how exposure to PMT is associated with political interest and engagement over time. Prior studies have largely focused on cross-sectional or between-person analyses (e.g., Dobber et al., 2019; Hirsch et al., 2024; Zarouali et al., 2022), but this study highlights the importance of considering intra-individual changes and dynamics. In doing so, it responds to recent calls in the field of media effects research (Beyens et al., 2021; Valkenburg et al., 2021) to go beyond static assessments of media exposure and explore the temporal dimensions of its relationship with political outcomes. The finding that PMT exposure is positively related to political engagement and interest at the between-person level supports the idea that tailored political content is associated with citizens' connection to the political process (Matthes et al., 2022; Zarouali et al., 2024; Zuiderveen Borgesius et al., 2018). However, the lack of significant within-person associations indicates that consistent, sustained exposure to PMT may be more influential in shaping political interest and engagement than temporary fluctuations in exposure (e.g., such a political election campaign). This distinction enriches the theoretical understanding of how PMT operates within a broader media ecology (Van Aelst et al., 2017) and emphasizes the need for future research to continue exploring these relationships using longitudinal designs that can capture both stable and dynamic elements of political campaigns on social media.

From a practical perspective, these findings also offer relevant insights for political campaign strategists and practitioners. While individuals who report higher exposure to PMT also tend to be more politically interested and engaged, the absence of within-person effects suggests that increasing the intensity of microtargeted political advertising during a campaign does not necessarily lead to additional increases in citizens' political interest or engagement over time. In other words, simply increasing the volume of microtargeted ads may have limited capacity to further mobilize citizens. Instead, PMT may primarily reach or resonate with individuals who are already politically attentive. For campaign practitioners, this implies that microtargeting should not be viewed as a standalone mobilization tool, but rather as one component within a broader campaign strategy aimed at sustaining engagement among politically interested audiences.

From a policy perspective, these findings are particularly relevant in light of recent regulatory developments in the European Union (EU) concerning the transparency and targeting of political advertising. The new EU regulation on the transparency and targeting of political advertising introduces strict requirements regarding transparency and the use of personal data in political advertising (European Commission, 2025). Although the regulation does not prohibit political advertising outright, the increased regulatory burden has already led major platforms such as Meta to discontinue political, electoral, and social issue advertising in the EU (Meta, 2025). In this context, the present findings suggest that concerns about the influence of PMT on citizens' political interest and engagement may need to be considered carefully, as our results do not show evidence that temporary increases in PMT exposure are associated with within-person changes in these political outcomes.

This study has several limitations that should be considered. First, the reliance on self-reported data for measuring exposure to PMT may introduce recall bias or social desirability bias, as participants might not accurately assess their exposure to political content. Future research could enhance accuracy by incorporating objective measures, such as tracking actual PMT exposure through digital footprints or platform data (Chu et al., 2024b; Kruikemeier et al., 2022). Second, exposure to PMT was measured using a single self-reported item. Although single-item measures are not inherently inferior and can provide valid assessments under certain conditions (Allen et al., 2022; Matthews et al., 2022), they do not allow internal consistency reliability estimation and may be more vulnerable to measurement error. In addition, a single indicator may not fully capture the potentially multidimensional nature of PMT exposure. Future research could therefore benefit from employing more comprehensive multi-item measures to capture exposure to PMT more precisely. Third, while the longitudinal design with three-month intervals between waves provides valuable insights, this time lag may not capture the immediate, short-term effects of PMT exposure. Sudden increases in exposure might have had a more pronounced influence on political interest and engagement in the short term, but these effects could dissipate before the next wave of data collection. More frequent data collection, such as ESM, could offer a more nuanced view of these short-term dynamics (Ohme et al., 2024; Otto & Kruikemeier, 2023).

In conclusion, this study provides valuable insights into the associations between PMT and political interest and engagement. While the results show strong associations at the between-person level, suggesting that individuals with higher PMT exposure are more politically interested and engaged, no significant within-person associations were observed. This highlights the complexity of PMT's influence, underscoring the need for further research, particularly with more frequent data collection to better capture short-term dynamics. These findings contribute to the growing body of literature on PMT and offer important directions for future studies to explore the nuanced impact of PMT in different contexts and timeframes.

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APPENDIX A

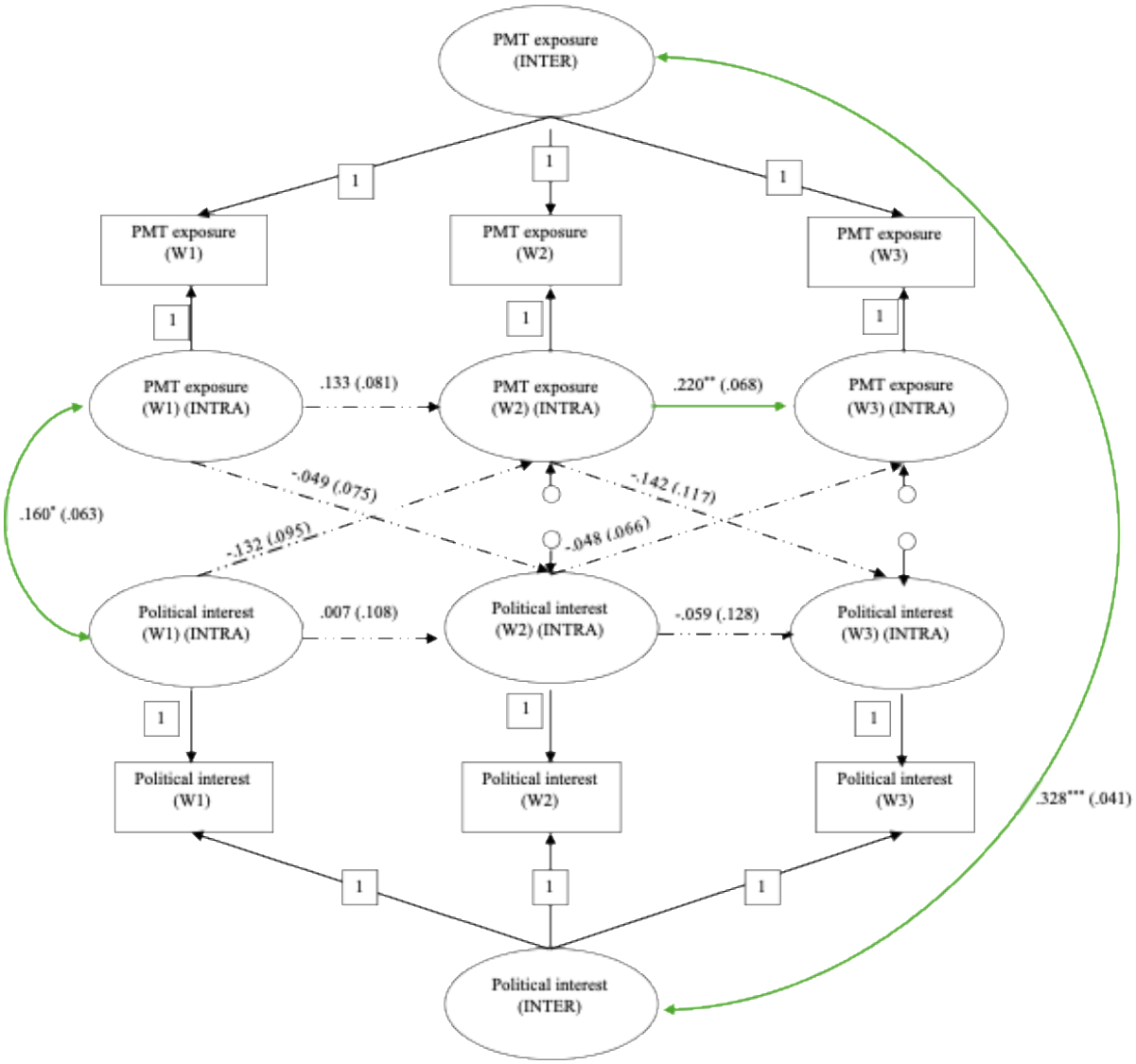

Figure A1. Visual representation of model 1 (i.e., PMT exposure and political interest) (non-significant paths are dashed and significant ones are displayed in green and bold (*p < .05, **p < .01, ***p < .001); the significant paths that represent constrained factor loadings are not displayed in bold; single headed arrows represent predictive paths, double headed arrows represent covariances; coefficients represent standardized beta values and the value within brackets represent standard errors; & for clarity, control variables and (un)correlated error terms are not shown) (Source: Created by the authors)

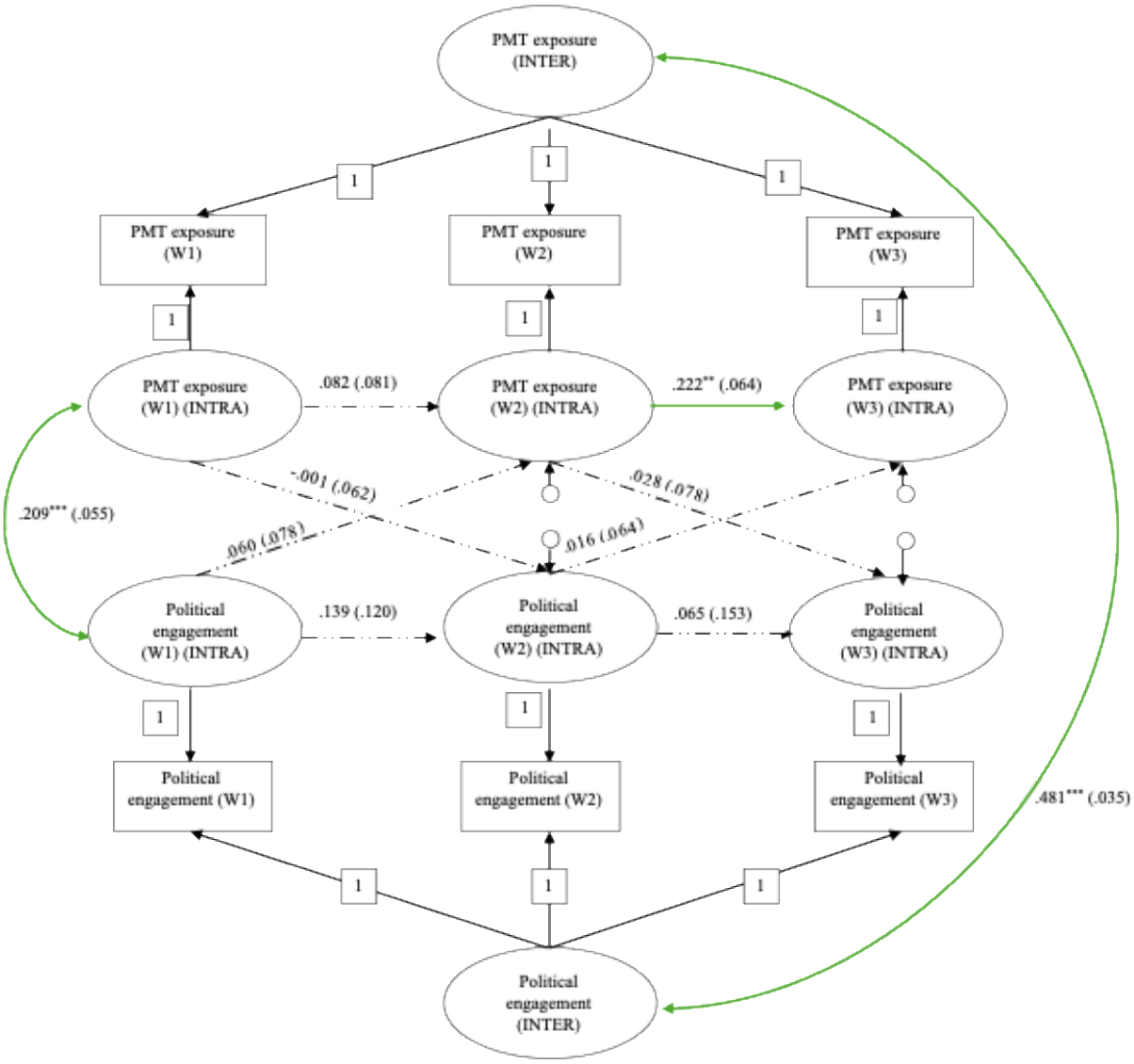

Figure A2. Visual representation of model 2 (i.e., PMT exposure and political engagement) (non-significant paths are dashed and significant ones are displayed in green and bold (*p < .05, **p < .01, ***p < .001); the significant paths that represent constrained factor loadings are not displayed in bold; single headed arrows represent predictive paths, double headed arrows represent covariances; coefficients represent standardized beta values and the value within brackets represent standard errors; & for clarity, control variables and (un)correlated error terms are not shown) (Source: Created by the authors)